User manual
of
FullSWOF_UI
Version 1.00 (2012-07-19)

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Installing and launching FullSWOF_UI

You must have Java 1.5 or later installed to run FullSWOF_UI. Java 1.6 or later is recommended. You do not need to have FullSWOF_1D or FullSWOF_2 to run FullSWOF_UI, but you will not be able to run simulations without these applications.

To launch FullSWOF_UI in a terminal, use the following command in the directory that contains the file FullSWOF_UI.jar (do not extract this file) :

```
java -jar FullSWOF_UI.jar
```

Depending on your system, you may be able to lauch FullSWOF_UI by right-clicking on the .jar file and opening it with Java.

FullSWOF parameters

Creating or opening a project

FullSWOF_UI allows you to work on project files with the extension .fsp. Each project is linked to a FullSWOF configuration (either FullSWOF_1D or FullSWOF_2D). To change the configuration used, choose a configuration in the preferences (under 'FullSWOF') then create a new project. You can save the project with *'File > Save the project'* (Ctrl + S) or save it under a new name with *'File > Save project as...'*. Saving the project will create a .fsp file and a directory that contains the project data. This directory will also contain the output files. Do not change the name of this directory.

Importing a parameters file

In order to reuse data that was not created with FullSWOF_UI, you must use the command *'Import a parameters file'*. This command will try to read data from a file that follows the format of *parameters.txt*. Be sure to set the right FullSWOF configuration (1D or 2D) when you create the project, before you import the file.

Set the parameters

FullSWOF_UI allows you to easily set the parameters needed to run FullSWOF. You only have to set the values of the different fields. Some fields accept integers, others decimal numbers. If the value is incorrect the field will be highlighted in red. For more information about the different parameters, please read the FullSWOF user manual.

N.B. : Decimal numbers can be written using the standard notation 1.234 or the scientific notation 1.23e-4

Other files

You can visualize input files (such as topography files, HUV files, rain files) once you have indicated their path. The *'visualize'* button opens a window showing a chart or a 3D representation of the file data. 3D figures can be manipulated like those in output files visualization.

When you indicate a path to an input file, FullSWOF_UI will try to copy this file in the '*Inputs*' directory of the project. However this copy may fail with very large files (2Gb or more). If this happens, manually copy the file in the directory named *'Inputs'* and indicate this new file as parameter of the project.

Generating input files

You can generate input files using FullSWOF_UI. Rain files are generated using a table of values, while HUV and topography files may be created using a formula parser. You can set a parameter according to the value of the variables x, y and t, for example z = sin(x + y).

You must set the domain parameters before you can generate these files (under Space & Time)
Please note that variables x, y or t may not always be useful (for example y in the case of a FullSWOF_1D file or t in the case of a spatial description file). If this is the case, the value of this variable is 0.
You can use the following functions :

- abs(a) : Absolute value of a
- acos(a) : Arc cosine of a
- asin(a) : Arc sine of a
- atan(a) : Arc tangent de a
- atan2(x, y) : theta phase of the polar coordinates (r, theta) of a point given with its Cartesian coordinates (x, y)
- cbrt(a) : Cube root of a
- ceil(a) : Smallest integer greater than or equal to a
- cos(a) : Cosine of a
- cosh(a) : Hyperbolic cosine of a
- exp(a) : Euler's number e raised to the power of a
- expm1(a) : e^x -1
- floor(a) : Greatest integer smaller than or equal to a
- hypot(x, y) : sqrt(x^2 +y^2)
- log(a) : Natural logarithm (base e) of a
- log10(a) : Base 10 logarithm of a
- max(a, b) : The greater of the two arguments a and b
- min(a, b) : The smaller of the two arguments a and b
- pow(a, b) : a raised to the power of b
- random() : Random value greater than or equal to 0.0 and less than 1.0
- rint(a) : The integer closest to a
- signum(a) : Zero if the argument is zero, 1 if the argument is greater than zero, -1 if the argument is less than zero.
- sin(a) : Sine of a
- sinh(a) : Hyperbolic sine of a
- sqrt(a) : Square root of a
- tan(a) : Tangent of a
- tanh(a) : Hyperbolic tangent of a

Calculation

In order to run FullSWOF with the project parameters, you must first indicate the path to the binary executable FullSWOF file in the preferences (under *'FullSWOF'*)

Then you can launch the computation using *File > Run simulation* or F5.

Messages from FullSWOF are written in a console, which also indicate the progression of the simulation and gives you the ability to interrupt FullSWOF. You can also activate the visualization of the output file while it is being created by FullSWOF. In this case you will be able to visualize the file up to the last time step computed. This functionality may slow down FullSWOF. It can be deactivated in the preferences.

Output files visualization

You can visualize output file previously computed by FullSWOF using *File > Open output files*

This functionality allows to visualize only Gnuplot and VTK files created by FullSWOF_1D or FullSWOF_2D. These files are usually named huv_evolution. Files named huv_initial and huv_final can be read, but they do not show the evolution of the simulation.

VTK files

VTK files produced by FullSWOF_2D can be read, but they do not include the time value of each time step. The interface uses default values instead, which will usually be different from those included in Gnuplot files. The same simulation will produce slightly different visualizations depending on the file format. Gnuplot format should be used.

Spatial visualization

The tab shows a spatial visualization of the simulation. You can play the animation showing the evolution using the buttons at the bottom of the panel. This animation is only available if the file contains multiple time steps.

Boundaries evolution

If the file contains multiple time steps, the evolution tabs will be activated. They display diagrams showing the evolution of values during time. The values displayable for each boundary are the instant discharge, the cumulated discharge and the water height.

Manipulating 3D figures

Output files generated by FullSWOF_2D are shown as 3D figures. You can rotate the figure with the mouse (left button). To drag the figure, keep the wheel down and move the mouse. To zoom in or out, use the wheel.

Exporting diagrams and adding data

You can add data to the diagrams or export them as image files. Right-click on the diagram and choose the appropriate item in the pop-up menu. These functionalities are not available on 3D figures.

Supported image file formats depend on your Java configuration, but PNG (recommended), GIF

and JPEG formats should usually be supported. The format of the image file produced depend on the extension that you indicate when you save the file.

To add custom data to a diagram, you must use a data file in which each line describes a point with the following format : x y. You can choose to display this data as a line or as a group of points. You can later erase this data using the diagram pop-up menu.

FullSWOF_UI preferences

You can access the application preferences under *Configuration > Preferences*

The preferences are stored in your user directory, in a hidden directory named *.fullswof_ui*

General

The default language used by FullSWOF_UI is that of the system, provided that the translation is available (currently English and French translations are provided), or English by default. You can choose one of the language available in this menu. This choice will only be visible after you restart the application.

If you select the 'Include parameters description' box, FullSWOF_UI will add a description for each parameter included in the project *parameters.txt* file. Otherwise the file will only contain tags and their values.

FullSWOF

This tab lets you indicate the command to be used in order to run FullSWOF. It also lets you choose the default configuration for new projects.

Visualization

This tab allows you to choose visualization settings. You can choose to visualize files that are being created by FullSWOF. However, this functionality may slow down FullSWOF.

You can also choose the data to be displayed on spatial visualization figures, as well as the color used for each data type.